NATIONAL MAINTENANCE WORK REQUIREMENTS

FOR

Front and Rear Differentials

NSN 2520-01-291-2975, PN 12338415-3 NSN 2520-01-358-3160, PN 12342615

AND

CONVERSION OF

NSN 2520-01-293-1626 NSN 2520-01-188-5115

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U.S. ARMY TANK-AUTOMOTIVE AND ARMAMENTS COMMAND WARREN, MICHIGAN 48397-5000

As of March 21, 2003

WARNING SUMMARY

- Improper cleaning methods and use of unauthorized cleaning solutions may cause injury to personnel or damage to equipment. See TM 9-247 for correct information.
- Compressed air used for cleaning purposes will not exceed 30 psi (207 kPa).
 Use only with effective chip guarding and personal protective equipment (goggles/shield, gloves, etc.).
- Do not use compressed air to dry bearings. Spinning a dry bearing with compressed air may cause injury to personnel or damage to equipment.
- Direct all personnel to stand clear during hoisting operations. Failure to do this may cause injury.
- When steam cleaning, protective clothing must be used. Failure to do this may cause injury.
- When sanding fiberglass, personal protective equipment (respirator, goggles/shield, gloves, coveralls, etc.) must be used. Failure to do this may cause injury.
- Do not operate heater in enclosed areas. Exhaust gases can kill. Make sure work area is well ventilated and exhaust fumes are routed away from test area.
- Drycleaning solvent is flammable and will not be used near an open flame. A
 fire extinguisher will be kept nearby when solvent is used. Use only in wellventilated places. Failure to do this may result in injury to personnel or
 damage to equipment.

INSERT LATEST CHANGED PAGES / WORK PACKAGES, DESTROY SUPERSEDED DATA

LIST OF EFFECTIVE PAGES / WORK PACKAGES

NOTE: The portion of text affected by the changes is indicated by a vertical

line in the outer margins of the page.

Dates if issue for original and changed pages / work packages are:

Original... as of March 21, 2003

TOTAL NUMBER OF PAGES FRONT AND REAR MATTER IS 12 AND TOTAL NUMBER OF WORK PACKAGES IS 116 CONSISTING OF THE FOLLOWING:

Page / WP No.	*Change No.	Page / WP No.	*Change No.	Page / WP No.	*Change No.
Cover	0				
Warning	0				
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WP 0001-1 - WP 0012-2	0				

^{*}Zero in this column indicates an original page or work package

NATIONAL MAINTENANCE REPAIR STANDARDS FOR

Front and Rear Differentials

NSN 2520-01-291-2975 NSN 2520-01-358-3160

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this publication. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Submit your DA Form 2028 (Recommended Changes to Publications and Blank Forms), through the Internet, on the Army Electronic Product Support (AEPS) website. The Internet address is http://aeps.ria.army.mil. If you need a password, scroll down and click on "ACESS REQUEST FORM." The DA Form 2028 is located in the ONLINE FORMS PROCESSING section of the AEPS. Fill out the form and click on SUBMIT. Using this form on the AEPS will enable us to respond quicker to your comments and better manage the DA Form 2028 program. You may also mail, fax or E-mail your letter or DA Form 2028 direct to: AMSTA-LC-CI Tech Pubs, TACOM-RI, 1 Rock Island Arsenal, Rock Island, IL 61299-7630. The E-mail address is TACOM-TECH-PUBS@ria.army.mil. The fax number is DSN 793-0726 or Commercial (309) 782-0726.

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GENERAL INFORMATION

0001

THIS WORK PACKAGE (WP) COVERS:

Scope; Applicable Documents; Definitions; Differential Repair Description; After Repair Performance Test; Disposal; Maintenance Forms, Records, and Reports; Reporting Equipment Improvement Recommendations (EIR); Corrosion Prevention and Control (CPC); Quality of Material; Engineering Change Proposals (ECP)

SCOPE

This NMWR covers the repair of the front and rear differentials, NSN 2520-01-291-2975, 2520-01-358-3160 (Conversion of NSN 2520-01-293-1626 or NSN 2520-01-188-5115 to NSN 2520-01-291-2975). We use these differentials in the High Mobility Multipurpose Wheeled Vehicle (HMMWV). The procedures contained in this NMWR describe disassembly, inspection, component repair, and assembly to ensure a product that is serviceable and issuable to all customers without limitation or restriction, Condition Code A.

APPLICABLE DOCUMENTS

You can receive copies of the applicable documents upon request by contacting:

Commodity Business Unit USA TACOM AMSTA-LC-CHL Jody.Mcinerney@us.army.mil Warren MI 48397-5000

The following documents form a part of this NMWR to the extent specified herein.

- 1. TM 9-2320-280-10
- 2. TM 9-2320-280-20-2
- 3. TM 9-2320-280-34
- 4. TM 9-2320-280-24P
- MIL-P-14105C
- 6. TACOM Drawing Number 12338415
- 7. TACOM Drawing Number 12342615
- 8. After Repair Performance Specifications and Test WP0007
- 9. After Repair Performance Test Report WP0008
- 10. Special Packaging Instruction WP0009
- 11. AdditionalRepair Instructions WP0010
- 12. Mandatory Replacement List WP0011
- 13. Differential Guide Pin Fabrication WP0012

GENERAL INFORMATION - Continued

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DEFINITIONS

Repair: Restoring a component to its original performance condition, replacing parts if necessary.

Rebuild: Restoring an item to a standard as nearly possible to original or new condition in appearance, performance, and life expectancy. Accomplished by complete disassembly of the item, inspection of parts or components, repair or replacement of worn or unserviceable elements using original manufacturing tolerance and specifications and subsequent reassembly of the item.

OEM: The original equipment manufacturer. The company that originally manufactured, fabricated or supplied an engine component or part. OEM may include items manufactured by a subcontractor for an original equipment manufacturer, provided that the name or trademark of the OEM is shown on the item, label, or container.

After Market Part: Any part or component that has been manufactured or fabricated by a company other than the original equipment manufacturer or their approved subcontractors and sold as a replacement part for an OEM part or component.

Serviceable Part: Any part that is capable of meeting or exceeding the minimum OEM standards for performing the function for which it was originally designed.

Non-serviceable Part: Any part that no longer meets minimum OEM standards.

DIFFERENTIAL REPAIR DESCRIPTION

1. Differential assemblies, NSN 2520-01-291-2975 and 2520-01-358-3160 will be in various states of disrepair. Determine that component parts conform to established standard(s). Reject all nonconforming parts. All gear teeth, machine surfaces, shims, and bearing caps will be free from embedded metal chips or metal shavings. You will repair differential assemblies so that they meet the configuration of drawing 12338415 or 12342615 depending on configuration and the performance specifications described on WP 0007. This standard will provide a serviceable component issuable to all customers without limitation or restriction, Condition Code A.

GENERAL INFORMATION - Continued

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NOTE

Some old differential(s), NSN 2520-01-293-1626 or 2520-01-188-5115 may be mismarked as NSN 2520-01-291-2975.

- 2. Some of the old differential(s), NSN 2520-O1-293-1626 or 2520-O1-188-5115 may be mismarked as NSN 2520-O1-291-2975. A description of how to identify each is:
- a **OLD STYLE**: A <u>2-piece</u> machined casting with the end cap secured with <u>3 each</u>, 1/2" X 4-3/4" bolts. The spur gears on the combination spur/worm gear has 9 gear teeth each.
- b **NEW STYLE**: NSN 2520-01-357-5056 is of a <u>single</u> casting design with only pins to hold the gears in place. The spur gears on the combination spur/worm gear has 18 gear teeth each.

NOTE

The only sure way to determine/identify the correct NSN of the differential is by removing the back cover and visually inspecting the gear unit. All old differential(s), NSN 2520-01-293-1626 or 2520-01-188-5115, will be converted as noted below.

- 3. You can use OEM or equivalent after market repair parts when repairing the differential. When using other than OEM parts, the parts used must be able to be repaired or replaced using the existing procedures, tools, and repair parts specified in the HMMWV technical manuals.
- 4. Repaired differential assemblies must maintain the same differential to vehicle interface as the original equipment differential.
- 5. Differentials with cracked cases may be repaired, using new cases. See TM 9-2320-280-34 and 24P for parts and procedures.
- You may cannibalize serviceable or repairable parts from any unrepairable differential assembly for use when repairing other differential assemblies. For Conversion you will replace the differential gear – NSN 2520-01-357-5056 and bearings.
- 7. During the course of repair, any sub-components/parts of the differential showing obvious signs of imminent failure, excessive wear, or deterioration will be replaced with a fully serviceable replacement.

GENERAL INFORMATION - Continued

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MAINTENANCE FORMS, RECORDS, AND REPORTS

Department of the Army forms and procedures used for equipment will be those prescribed by (as applicable) DA PAM 738-750, Functional Users Manual for the Army Maintenance Management System (TAMMS); DA PAM 738-751, Functional Users Manual for the Army Maintenance Management - Aviation (TAMMS-A); or AR 700-138, Army Logistics Readiness and Sustainability.

REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR)

If your differential assembly, NSN 2520-01-291-2975 or 2520-01-358-3160 needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design or performance. Put it on an SF 368 (Product Quality Deficiency Report). Mail it to the address specified in DA PAM 738-750, Functional Users Manual for the Army Maintenance Management System (TAMMS), or as specified by the acquiring activity. We will send you a reply.

CORROSION PREVENTION AND CONTROL (CPC)

- 1. Corrosion Prevention and Control (CPC) of Army materiel is a continuing concern. It is important that any corrosion problems with this item be reported so that the problem can be corrected and improvements can be made to prevent the problem in future items.
- While corrosion is typically associated with rusting of metals, it can also include deterioration of other materials, such as rubber and plastic. Unusual cracking, softening, swelling, or breaking of these materials may be a corrosion problem.
- 3. If a corrosion problem is identified, it can be reported using SF 368, Product Quality Deficiency Report. Use of key words such as "corrosion," "rust," "deterioration," or "cracking" will ensure that the information is identified as a CPC problem.
- 4. The form should be submitted to the address specified in DA PAM 738-750, Functional Users Manual for the Army Maintenance Management System (TAMMS).

QUALITY OF MATERIAL

Parts and material used for replacement, repair, or modification shall meet the requirements of the equipment drawings and specified if standards are not provided in this NMWR.

ENGINEERING CHANGE PROPOSALS (ECP)

Engineering Change Proposals (ECPs) will be submitted using DD Form 1693 (Engineering Change Proposal [Short Form]). (Refer to MIL-STD-973, Configuration Management, for instructions.) Completed forms should be mailed directly to Commander, U.S. Army Tank-automotive and Armaments Command, ATTN: AMSTALC-CHLC, Jody McInerney, Warren, MI 48397-5000

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SUPPORTING INFORMATION

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THIS WORK PACKAGE (WP) COVERS:

Cleaning; General Inspection and General Repair

CLEANING

- a **General Instructions.** Cleaning procedures will be the same for the majority of parts and components which make up the vehicle subassemblies. General cleaning procedures are detailed in "b" through "h".
- b **The Importance of Cleaning.** Great care and effort are required in all cleaning operations. The presence of dirt and foreign material is a constant threat to satisfactory vehicle operation and maintenance. The following will apply to all cleaning operations:
- 1. Hands must be kept free of any accumulation of grease which can collect dust and grit.
- 2. Clean all parts before inspection, after repair, and before assembly.
- 3. After cleaning, all parts must be covered or wrapped in plastic or paper to protect them from dust and/or dirt.
- c **Disassembled Parts Cleaning.** Place all disassembled parts in wire baskets for cleaning.
- 1. Dry and cover all cleaned parts.
- 2. Place on or in "racks" and hold for inspection or repair.
- 3. All parts subject to rusting must be lightly oiled and wrapped.
- 4. Keep all related parts and components together. Do not mix parts.

WARNING

Improper cleaning methods and use of unauthorized cleaning solutions will injure personnel and damage equipment. See TM 9-247 for correct information.

d Castings.

- 1. Clean inner and outer surfaces of castings and all areas subject to grease and oil with cleaning solvents. Refer to TM 9-247.
- 2. Use a stiff brush to remove sludge and gum deposits.

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WARNING

Compress air used for cleaning purposes will not exceed 30 psi (207 kPa). Use only with effective chip guarding and personal protective equipment (goggles/shield, gloves, etc.).

- 3. Use compressed air to blow out all tapped capscrew holes and dry castings after cleaning.
- e **Oil Passages.** Particular attention must be given to all oil passages in castings and machined parts. Oil passages must be clean and free of any obstructions.
- 1. Clean passages with wire probes to break up any sludge or gum deposits.
- 2. Wash passages by flushing with solvents. See TM 9-247.
- 3. Dry passages with compressed air.

CAUTION

Do not allow solvents to come in contact with seals, cables, or flexible hoses. These cleaners cause leather, rubber, and synthetic materials to dry out, rot, and lose pliability making then unserviceable.

- f Nonmetallic Parts. Clean hoses and other nonmetallic parts with soap and water.
- g Bearings.

WARNING

Do not use compressed air to dry bearings. Spinning a dry bearing with compressed air may cause injury to personnel or damage to equipment.

- 1. Bearings require special cleaning. After removing surface oil and gum deposits wipe bearings dry with a lint-free cloth; do not use compressed air.
- 2. See TM 9-214 for information and care of bearings.

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h Electrical Components.

1. Clean electrical components with clean cloth dampened with drycleaning solvent. Care must be taken not to damage protective insulation.

WARNING

Compressed air used for cleaning purposes will not exceed 30 psi (207 kPa). Use only with effective chip guarding and personal protective equipment (goggles/shield, gloves, etc.).

2. Use compressed air to dry electrical components.

GENERAL INSPECTION

a **General Instructions.** Procedures for inspections will be the same for many parts and components which make up the vehicle subassemblies. General procedures are detailed in "b" through "k". Dimensional standards for parts have been fixed at extremely close tolerances, so use specification tables. Use specified inspection equipment for inspection where cracks and other damage cannot be spotted visually. Exercise extreme care in all phases of inspection. Repair or replace all unserviceable components.

b Castings.

- Inspect all ferrous and nonferrous castings for cracks. See MIL-STD-6866, Inspection, Penetrant Methods. Particularly check areas around studs, pipe plugs, threaded inserts, and sharp corners. Replace cracked castings.
- 2. Inspect machined surfaces for nicks, burrs, and raised metal. Mark damaged areas for repair or replacement.
- 3. Inspect all pipe plugs, pipe plug openings, capscrews, and capscrew openings for damage and stripped threads. Replace if damaged or threads are stripped.
- 4. Check all gasket mating surfaces, flanges on housings, and supports for warpage with a straightedge or surface plate. Inspect mating flanges for discolorations which may indicate leakage. Replace if warped.
- Check all castings for conformance to applicable repair standards. Refer to TM 9-214.
- c **Bearings.** Check all bearings for conformance to applicable repair standards.

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- d Bushings and Bushing Type Bearings.
- 1. Check all bushings and bushing type bearings for secure fit, evidence of heating, wear, burrs, nicks, and out-of-round condition.
- 2. Check for dirt in lubrication holes or grooves. Holes and grooves must be clean and free from damage.
- e Machined Parts.
- 1. Check machined parts for cracks, distortion, and damage.
- 2. Check all surfaces for nicks, burrs, and raised metal.
- f **Studs, Bolts, Capscrews, and Nuts.** Replace if bent, loose, stretched, or threads are damaged.
- g **Gears**.

NOTE

When gear teeth wear limits are not established, good judgement is required to determine if gear replacement is necessary.

- Inspect all gears for cracks and missing teeth. Replace if cracked or teeth are missing.
- 2. Inspect gear teeth for wear, sharp fins, burrs, and galled or pitted surfaces.
- 3. Inspect splines for wear, burrs, and galled or pitted surfaces.
- 4. Check keyway slots for wear and/or damage.
- 5. Inspection procedure for converted differentials.

NOTE

Inspection procedure for Differentials already converted to the new Differential Gear Unit, NSN 2520-01-357-5056

- (a) Remove differential gear unit from the differential housing.
- (b) Clean gear unit.

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- (c) Insert axle shafts into gear unit and manually turn axle shafts both clockwise and counterclockwise to get a full 360° turn on the gears while visually inspecting the center gear and all 3 sets of worm/spur gears for chipped/broken gear teeth, scarring, discoloration, and sharp/knifed edges on the worm gears. Minor scarring & discoloration of gears is allowable. Replace gear unit if gears are broken or knifed edged. A single chipped spur gear per set is allowable. Replace differential gear unit if more than a single chipped spur gear per set is found.
- (d) While turning the shafts, gears must turn freely and smoothly. Evidence of binding is not allowed.
- (e) Measure the end play (thrust) of the center gear with feeler gauges between the thrust washer and center gear. Measurement is taken at the end opposite side of the ring gear mounting. Turn the axle shafts to ensure that the center gear is tight against the thrust washers at the ring gear end before taking reading. If the measurement is 0.074 (+ 0.000", -0.003") the differential gear unit is replaced.
- (f) Scoring around the outside of the gear unit housing from the pinion gear is evidence of pinion gear bearing failure or loss of the pre-load on the pinion shaft. If gouging is deeper than 0.0625" (1/16"), the gear unit must be replaced. Slight "metal peen over" can be dressed up with a file ensuring that the filings do not get into the gear unit. Any "metal peen over" in the area of the spur/worm gears must not interfere with the rotation of the gears. (The 1/16" is an approximate measurement that the mechanic's judgement and expertise is taking into account how wide the scoring is and if it goes all the way around the gear housing.)
- h **Oil Seals.** Oil seals are mandatory replacement items.
- i Casting Plugs. Inspect for leakage. Replace plugs when leakage is present.
- **Springs.** Inspect for damaged, distorted, and collapsed coils.
- k **Snaprings**, **Retaining Rings**, **and Washers**. Many of these parts are mandatory replacement items. Inspect all others for obvious damage.

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GENERAL REPAIR

a **General Instructions.** Repair of most parts and components is limited to general procedures outlined in applicable maintenance instructions and the following detailed procedures "b" through "h."

CAUTION

Repaired items must be thoroughly cleaned to remove metal chips and abrasives to prevent them from entering working parts of vehicle components.

- b Castings.
- 1. All cracked castings will be replaced.
- 2. Only minor repairs to machined surfaces, flanges, and gasket mating surfaces are permitted. Remove minor nicks, burrs, and/or scratches by:
 - a. Using fine mill file.
 - b. Using abrasive cloth dipped in cleaning solvent.
 - c. Lapping across a surface plate.
 - d. Remachining of machined surfaced to repair damage, warpage, or uneven surfaces is not permitted. Replace castings.
- 3. Repair damaged threaded pipe plug and/or capscrew holes with a thread tap or repair oversize holes with threaded inserts.
- c **Bearings.** See TM 9-214.
- d **Studs.** Replace all bent and stretched studs. Repair minor thread damage with a thread restorer file. Replace studs having stripped or damaged threads as outlined below:
- 1. Remove, using a stud remover. Back studs out slowly to avoid heat buildup and seizure which can cause stud to break off.
- 2. If studs break off too short to use a stud remover, use extractor to remove.
- Replacement studs have a special coating and must have a small amount of antiseize compound (NSN 8030-00-059-2761) applied on threads before stud is installed. Install replacement stud slowly to prevent heat buildup and snapping off.

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- e Gears.
- 1. Remove gears using pullers, as required.
- 2. Use the same methods described in paragraph b.2. (WP0002) for castings to remove minor nicks, burrs, or scratches on gear teeth.
- 3. If keyways are worn or enlarged, replace gear.
- f **Bushings and Bushing Type Bearings.** When bushings and bushing type bearings seize to a shaft and spin in the bore, the associated part must also be inspected and replaced, as required.
- g Oil Seals.
- 1. Remove oil seals, being careful not to damage casting or adapter bore.
- 2. Always install new seal in bore using proper seal replacing tool.
- h **Locking Threads.** When using thread sealing compound:
- 1. Apply a liberal amount to both male and female threads on through-hole assemblies.
- 2. Apply a liberal amount into the bottom of a blind hole (non-through hole assemblies). Installing the fastener pneumatically forces the adhesive onto the threads.
- 3. Assemble parts shortly after applying thread sealing compound to allow adequate coating of threads.

END OF TASK

DIFFERENTIAL REPAIR

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THIS WORK PACKAGE (WP) COVERS:

Disassembly

INITIAL SETUP:

<u>Tools</u>

General mechanic's tool kit: automotive	(NSN 5180-00-177-7033)
Dial indicator	(NSN 5210-00-277-8840)

Special Tools

Differential housing spreader	(NSN 4910-00-105-2823)
Rear pinion bearing cup remover	(NSN 5120-01-185-7957)
Front pinion bearing cup remover	(NSN 5120-01-187-3660)
Driver handle	(NSN 5120-00-677-2259)
Axle holding fixture adapters	(NSN 5120-01-218-8235)

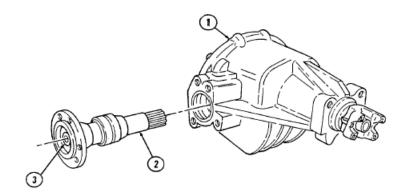
NOTE

- Convert all old differential(s), NSN 2520-01-293-1626 or 2520-01-188-5115, by replacing the old differential gear with NSN 2520-01-357-5056.
- Work area should be clean, well ventilated, and free from blowing dirt and dust.
- Refer to axle differential housing identification part number, located on housing, before ordering any replacement parts.

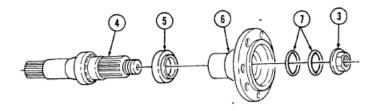
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DISASSEMBLY

- 1. Loosen locknut (3) on output shaft assembly (2).
- 2. Using slide hammer, remove output shaft assembly (2) from differential housing (1).

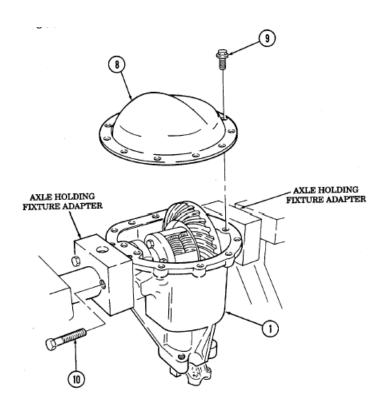


- 3. Remove locknut (3), two O-ring seals (7), output flange (6), and output shaft seal (5) from output shaft (4). Discard O-ring seals (7), output shaft seal (5), and locknut (3).
- 4. Repeat steps 1 through 3 for opposite side.



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- 5. Install axle holding fixture adapters on housing (1) with four capscrews (10). Place housing (1) in holding stand.
- 6. Position housing (1) so differential cover (8) faces up. Remove twelve capscrews (9) and cover (8) from housing (1).



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7. Mark two bearing caps (1) and housing (3) for assembly and remove four capscrews (2) and two bearing caps (1) from housing (3).

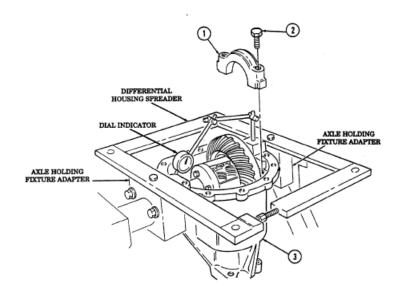
NOTE: Bearings may be marked by Manufacturer.

8. Install differential housing spreader into holes in axle holding fixture adapters and install dial indicator to read from each end of housing (3). Dial indicator must have preload setting of 0.020 in. (0.5 mm).

CAUTION

Over-tightening of differential housing spreader will damage differential housing.

9. Spread housing (3) 0.010 in. (0.25 mm) and remove dial indicator.

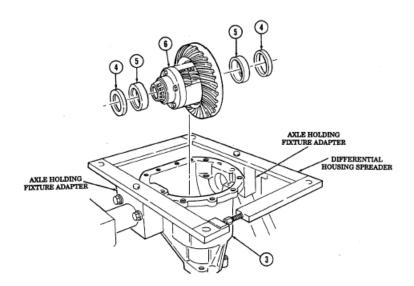


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NOTE

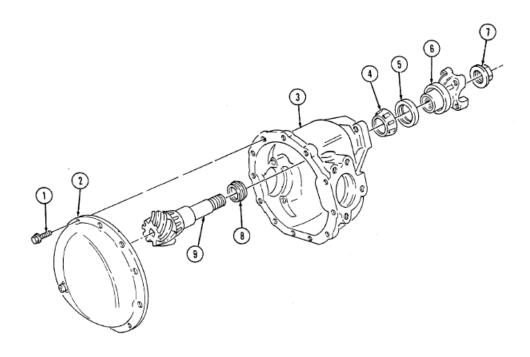
Tag bearing shims and bearing cups for assembly.

- 10. Remove differential case (6), two bearing cups (5), and shims (4) from housing (3).
- 11. Relieve pressure on housing spreader and remove from housing (3).



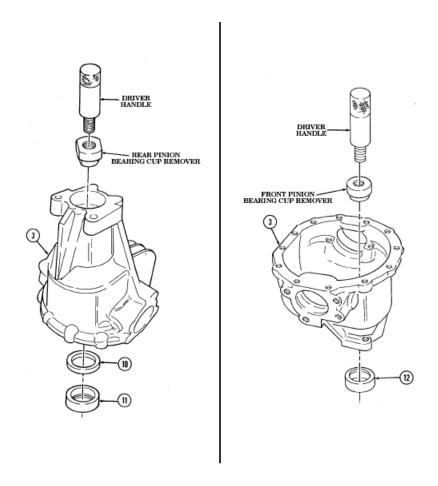
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- 12. Rotate housing (3) 90°. Install cover (2) and two capscrews (1) on housing (3).
- 13. Remove locknut (7) securing pinion yoke (6) to pinion gear (9).
- 14. Remove pinion yoke (6) from pinion gear (9).
- 15. Drive pinion gear (9) out of front pinion bearing (4).
- 16. Remove two capscrews (1), cover (2), pinion gear (9), and collapsible spacer (8) from housing (3). Discard collapsible spacer (8).
- 17. Remove pinion seal (5) and front pinion bearing (4) from housing (3). Discard pinion seal (5).



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- 18. Rotate front of housing (3) upward 90°. Using driver handle and rear pinion bearing cup remover, remove rear pinion bearing cup (11) and pinion depth shim (10) from housing (3).
- 19. Rotate housing (3) 180°. Using driver handle and front pinion bearing cup remover, remove front pinion bearing cup (12) from housing (3).

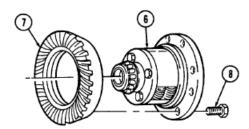


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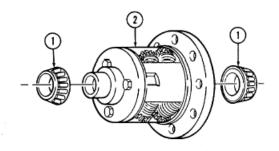
CAUTION

Do not chisel or wedge ring gear from differential case or damage may result.

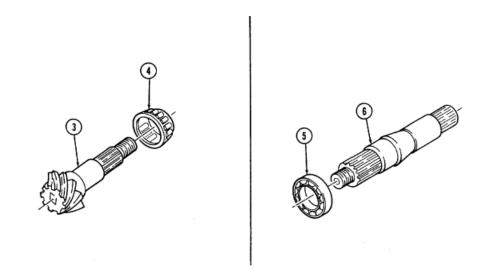
20. Remove eight capscrews (8) and ring gear (7) from differential case (6).



21. Remove two differential side bearings (1) from differential case (2).



- 22. Remove rear pinion bearing (4) from pinion gear (3).
- 23. Remove bearings (5) from output shafts (6).



END OF TASK

DIFFERENTIAL REPAIR

0004

THIS WORK PACKAGE (WP) COVERS:

Cleaning; Specific Inspection Procedures

CLEANING

Clean all differential parts in accordance with CLEANING, WP 0002.

SPECIFIC INSPECTION PROCEDURES

NOTE

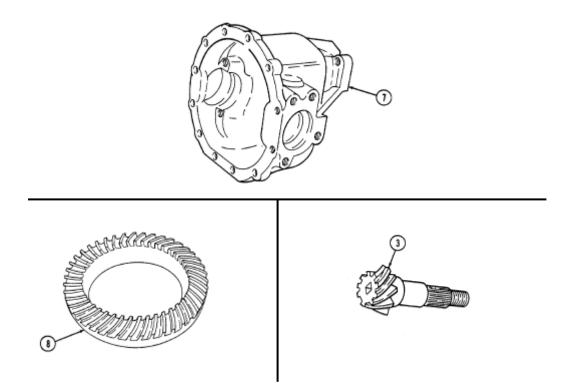
For general inspection instructions, refer to **GENERAL INSPECTION**, **WP 0002**.

1. Inspect housing (7) and all threaded holes for damage. Repair any damaged threads with thread repair inserts. Replace differential if housing (7) is damaged.

NOTE

Ring and pinion gears must be replaced as matched set.

2. Inspect splines and gear teeth on pinion gear (3) and ring gear (8) for damage. Replace both pinion gear (3) and ring gear (8) if either are damaged.

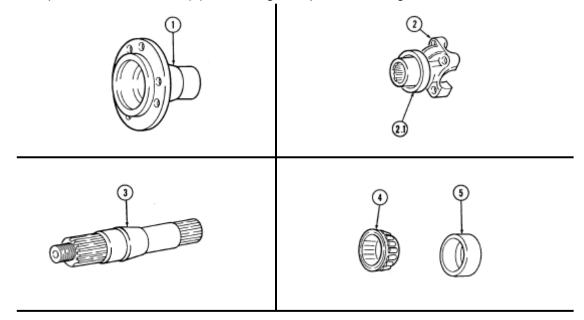


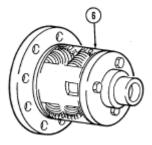
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3. Inspect splines and sealing surfaces on output flanges (1), pinion yoke (2), axle slinger (2.1), and output shafts (3) for damage. Replace if damaged.

NOTE

- If rear pinion yoke is being replaced, a new slinger must be installed on new pinion yoke.
- Push rear pinion yoke into slinger until slinger is seated against rear shoulder of yoke.
- 4. Inspect all bearings (4) and bearing cups (5) for damage. Replace bearings (4) and bearing cups (5) in matched sets if either are damaged.
- 5. Inspect differential case (6) for damage. Replace if damaged.





END OF TASK

DIFFERENTIAL REPAIR

0005

THIS WORK PACKAGE (WP) COVERS:

Assembly

INITIAL SETUP:

Tools

General mechanic's tool kit: automotive (NSN 5180-00-177-7033)

Special Tools

Differential housing spreader	(NSN 4910-00-105-2823)
Pinion setting gauge set	(NSN 5180-01-216-8643)
Pinion setting gauge set	(NSN 5180-01-363-8079)
Rear pinion bearing cup remover	(NSN 5120-01-185-7957)
Rear pinion bearing cup installer	(NSN 5120-01-185-7962)
Front pinion bearing cup installer	(NSN 5120-01-185-7964)
Yoke seal installer	(NSN 4910-01-179-5530)
Driver handle	(NSN 5120-00-677-2259)
Output shaft installer	(NSN 5120-01-187-3659)
Axle holding fixture adapters	(NSN 5120-01-218-8235)

Material/Parts

O-ring seals	(NSN 5330-01-487-7129)
Three locknuts	(NSN 5310-01-175-0617)
Collapsible spacer	(NSN 5365-01-180-2585)
Pinion seal	(NSN 5330-01-174-8146)
Two output shaft seals	(NSN 5330-01-174-8145)
Silicone sealant	(NSN 6850-01-159-4844)
Lubricating oil:	

1 quart (NSN 9150-00-402-4478) 5 gallon (NSN 9150-00-402-2372) 55 gallon drum (NSN 9150-00-491-7197)

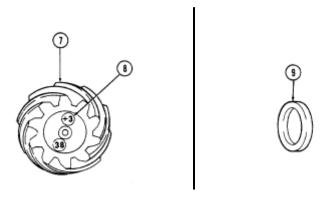
Four guide pins (See **WP 0012**)

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ASSEMBLY

NOTE

- Pinion gear depth is the distance from the end face of the pinion to the center line of the output shafts. The dimension is controlled by shims between pinion gear rear bearing cup and differential housing. The pinion gear is etched with two identifying numbers, the first number identifies ring gear and pinion gear as a matched set, the second number represents "pinion depth variance" and is preceded by a plus (+) or minus (-), this number represents the amount in thousandths the gear set varied from the "standard setting" 2.547 in. (6.46 cm).
- If using original gear set, use original pinion depth shim as a starter shim and proceed to step 4.
- 1. Measure thickness of original pinion depth shim (9) and record for reference.
- 2. Check pinion depth variance numbers (8) marked on old and new pinion gears (7) and record for references.



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NOTE

If the old pinion is marked -3 and the new pinion is marked +2, the procedure would be as follows: Refer to Old Pinion Marking column at left side of table and locate -3 in this column. Then read to right, across table, until under +2 in New Pinion Marking column. Box where two columns intersect is amount of shim thickness change required. In this case, the number in the intersecting box is -0.005 in. (0.12 mm) which represents the amount to be subtracted from the old shim thickness. If the box number had been a + figure, this amount would be added to the old shim thickness.

This table determines an initial shim thickness. The actual pinion depth measurement must be performed and final shim thickness adjusted as necessary.

3. Refer to Old and New Pinion Marking columns on pinion variance table. Note on table where old and new pinion depth variances intersect, this will determine amount to be added or subtracted from original pinion depth shim for desired pinion depth 'starter shim".

PINION VARIANCE TABLE (INCHES)

OLD	NEW PINION MARKING								
PINION MARKING	-4	-3	-2	-1	0	+1	+2	+3	+4
+4	+0.008	+0.007	+0.006	+0.005	+0.004	+0.003	+0.002	+0.001	0
+3	+0.007	+0.006	+0.005	+0.004	+0.003	+0.002	+0.001	0	-0.001
+2	+0.006	+0.005	+0.004	+0.003	+0.002	+0.001	0	-0.001	-0.002
+1	+0.005	+0.004	+0.003	+0.002	+0.001	0	-0.001	-0.002	-0.003
0	+0.004	+0.003	+0.002	+0.001	0	-0.001	-0.002	-0.003	-0.004
-1	+0.003	+0.002	+0.001	0	-0.001	-0.002	-0.003	-0.004	-0.005
-2	+0.002	+0.001	0	-0.001	-0.002	-0.003	-0.004	-0.005	-0.006
-3	+0.001	0	-0.001	-0.002	-0.003	-0.004	-0.005	-0.006	-0.007
-4	0	-0.001	-0.002	-0.003	-0.004	-0.005	-0.006	-0.007	-0.008

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- 4. Rotate housing (2) so front pinion bearing cup bore faces up.
- 5. Lubricate outside diameter of front pinion bearing cup (1) with lubricating oil. Using driver handle and front pinion bearing cup installer, install cup (1) in housing (2).

NOTE

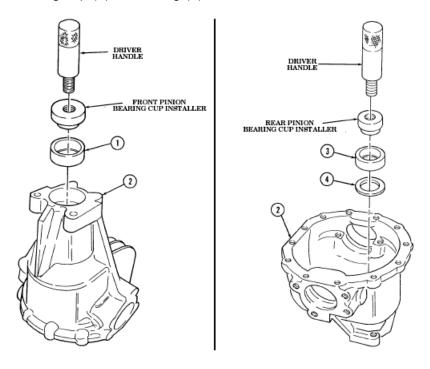
If repairing P/N 12338415-3, perform steps 6 through 22 and 37 through 41. If repairing P/N 12342615, perform steps 23 through 36.

6. Rotate housing (2) 180°. Lubricate outside diameter of rear pinion bearing cup (3) with lubricating oil.

NOTE

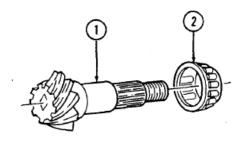
If the pinion shim is beveled, be sure the beveled side faces bottom of bearing cup bore.

7. Using driver handle and rear pinion bearing cup installer, install "starter shim" (4) and rear pinion bearing cup (3) in housing (2).



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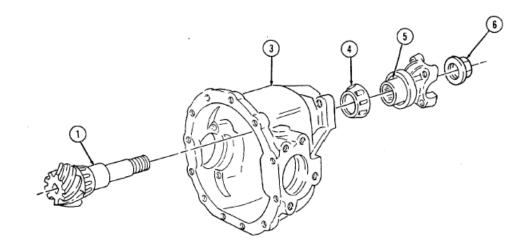
8. Install rear pinion bearing (2) on pinion gear (1).



NOTE

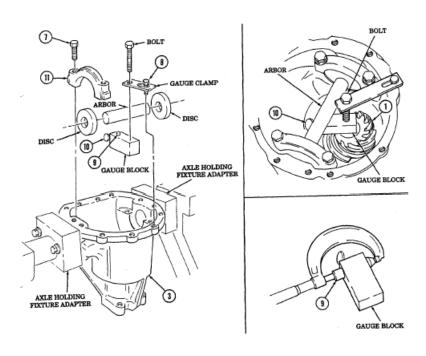
Do not install a replacement pinion nut and collapsible spacer at this time as the pinion gear will be removed after depth measurement.

- 9. Rotate housing (3) 90° and install pinion gear (1).
- 10. Install front pinion bearing (4), pinion yoke (5), and original pinion nut (6).
- 11. Tighten locknut (6) only enough to remove pinion bearing end play.



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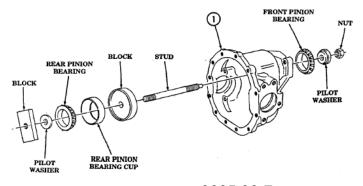
- 12. Rotate front of housing (3) downward 90°. Using pinion setting gauge set, assemble arbor and two discs and install in housing (3).
- 13. Install two bearing caps (11) and four capscrews (7) in housing (3) and tighten capscrews (7) finger tight.
- 14. Install gauge clamp on block and housing (3) with bolt and capscrew (8).
- 15. Depress plunger (9) on gauge block and tighten thumbscrew (10).
- 16. Position gauge block on end face of pinion gear (1) so gauge plunger (9) will contact bottom of arbor.
- 17. Tighten bolt on gauge clamp to hold gauge block in position.
- 18. Loosen thumbscrew (10) on gauge block to release plunger (9). When plunger (9) contacts bottom of arbor, tighten thumbscrew (10).
- 19. Loosen bolt on gauge clamp and remove gauge block from housing (3).
- 20. Measure gauge block. This dimension represents "measured pinion depth". Record for reference.
- 21. Remove capscrew (8), bolt, and gauge clamp from housing (3).
- 22. Remove four capscrews (7), two bearing caps (11), discs, and arbor from housing (3).



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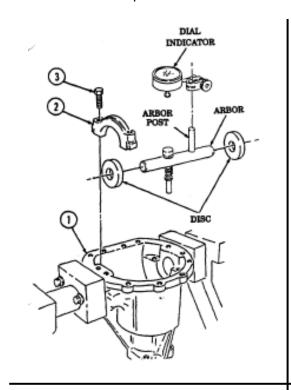
If repairing P/N 12342615, perform steps 23 through 36.

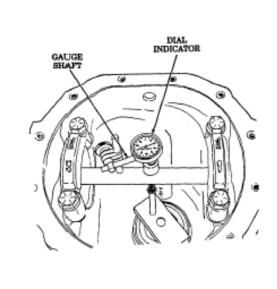
- 23. Using pinion setting gauge set, install block, rear pinion bearing cup, rear pinion bearing, and pilot washer on stud and secure with block.
- 24. Position stud assembly in housing (1) and install with front pinion bearing, pilot washer, and nut. Tighten nut to 10 lb-in. (1.13 N•m). Rotate the assembly several revolutions to seat the bearings and recheck the torque.
- 25. Rotate front of housing downward 90°. Assemble arbor and two discs and install in housing.
- 26. Install two bearing caps (2) and four capscrews (3) in housing (1) and finger tighten capscrews (3).
- 27. Position arbor on block and install dial indicator to arbor post. Preload the dial indicator until the needle rotates approximately one full turn clockwise. Tighten the dial indicator in this position and recheck.
- 28. Rotate gauge shaft slowly back and forth until the dial indicator reads the greatest deflection. At the point of greatest deflection, set the dial indicator to zero. Repeat the rocking action of the gauge shaft to verify the gauge setting.
- 29. After the zero setting is obtained, rotate gauge shaft until the dial indicator plunger does not touch the block.
- 30. Record the number of the dial indicator reading. Example: If the pointer moved counterclockwise and stops between 0 and 11, add .100" to measurement for shim thickness. If the pointer moves counterclockwise and stops between 99 and 84, correct shim thickness is indicated.
- 31. This reading indicates the shim thickness that is required of a pinion that is etched with a zero (0) on the pinion head. If the pinion being installed has a plus (+) or minus (-) etching, then an adjustment of the shim thickness is required. Example: If a pinion is etched '+3", then .003" less shim thickness is required. Subtract .003" from the indicator reading. If a pinion is etched "-3" then .003" more shim thickness is required. Add .003" to the indicator reading.
- 32. Remove dial indicator from arbor.
- 33. Remove four capscrews (3), two bearing caps (2), discs, and arbor from housing (1).

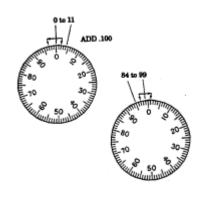


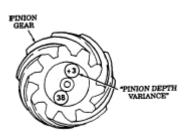
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- 34. Remove nut, pilot washer, front pinion bearing and stud assembly from housing.
- 35. Remove block, pilot washer, rear pinion bearing, rear pinion bearing cup and block from stud.
- 36. Proceed to step 42.







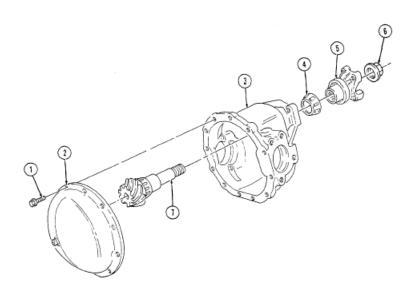


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NOTE

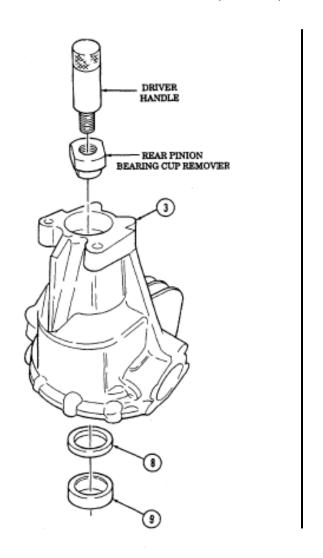
If repairing P/N 12338415-3 perform steps 37 through 41 and then proceed to step 42.

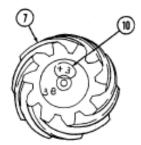
- 37. Rotate housing (3) 90°. Remove locknut (6) and pinion yoke (5) from pinion gear (7). Discard locknut (6).
- 38. Install cover (2) with two capscrews (1) on housing (3).
- 39. Drive pinion gear (7) out of front pinion bearing (4).
- 40. Remove two capscrews (1), cover (2), pinion gear (7), and front pinion bearing (4) from housing (3).



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- 41. Rotate front of housing (3) upward 90°. Using driver handle and rear pinion bearing cup remover, remove rear pinion bearing cup (9) and "starter shim" (8) from housing (3).
- 42. Note 'pinion depth variance" (10) marked on pinion gear (7). If number is preceded by a plus (+) sign, add that amount in thousands to 'standard setting" 2.547 in. (6.46 cm). If number is preceded by minus (-) sign, subtract that amount in thousands from "standard setting" 2.547 in. (6.46 cm). The result of this addition or subtraction is 'desired pinion depth". Record for references.
- 43. Measure thickness of 'starter shim" (8) and add this dimension to "measure pinion depth" (step 20). Result of this addition is 'total measured pinion depth". Record for reference.
- 44. Subtract 'desired pinion depth' (step 28) from 'total measured pinion depth" (step 29). Result of this subtraction is correct pinion depth shim (8) thickness.





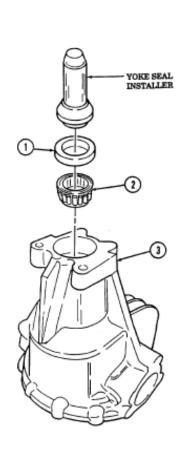
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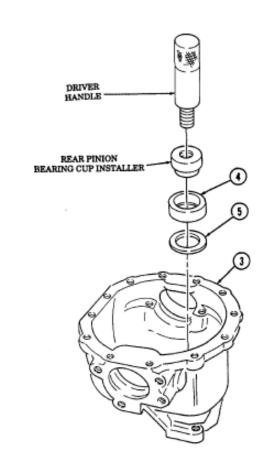
- 45. Lubricate front pinion bearing (2) and pinion seal (1) with lubricating oil. Using yoke seal installer, install front pinion bearing (2) and pinion seal (1) in housing (3).
- 46. Rotate housing (3) 180 degrees. Lubricate outside diameter of rear pinion bearing cup (4) with lubricating oil.

NOTE

If pinion shim is beveled, be sure beveled side faces bottom of bearing cup bore.

47. Using driver handle and rear pinion bearing cup installer, install correct thickness pinion shim (5) and rear pinion bearing cup (4) in housing (3).





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48. Rotate housing (3) 90°. Lubricate rear pinion bearing (6) with lubricating oil.

CAUTION

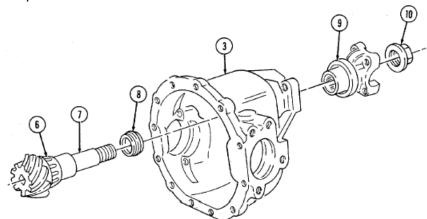
Collapsible spacer controls pinion bearing preload. Do not reuse old spacer or pinion bearing damage may result.

- 49. Install collapsible spacer (8) on pinion gear (7) and install pinion gear (7) in housing (3).
- 50. Install pinion yoke (9) with locknut (10) on pinion gear (7).

CAUTION

Do not exceed specified preload torque on pinion bearings. Do not loosen locknut to replace preload torque or pinion bearing damage may result. If specified torque is exceeded, remove pinion gear and replace collapsible spacer and locknut and adjust preload again.

- 51. Tighten locknut (10) only enough to remove end play and seat pinion bearings in housing (3). Rotate pinion yoke (9) while tightening, to seat bearings evenly.
- 52. Measure torque required to rotate pinion gear (7). Correct pinion bearing preload torque is 17-25 lb-in. (2-3 N•m) with new bearings and 10-15 lb-in. (1-2 N•m) with used bearings.
- 53. Continue to tighten locknut (10) in small increments until pinion bearing preload torque meets specifications.



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54. Install two side bearings (1) on differential case (2).

NOTE

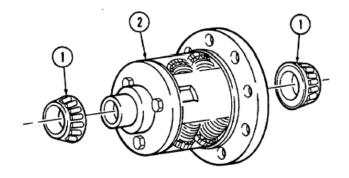
Side bearing shims are available in thickness from 0.077-0.117 in. (1.95-2.97 mm) in increments of 0.001 in. (.025 mm).

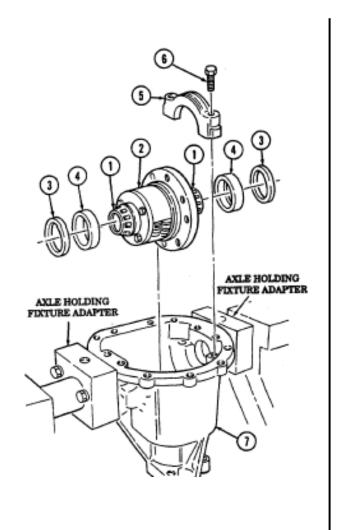
- 55. Rotate housing (7) downward 90°. Install two side bearing cups (4) and side bearings shims (3) on side bearings (1). Use 0.080 in. (2 mm) shims (3) as a starting point.
- 56. Install differential case (2), two bearing cups (4), and shims (3) in housing (7).
- 57. Install two bearing caps (5) and four capscrews (6) in housing (7). Snug capscrews (6).
- 58. Mount dial indicator on housing (7) and index indicator to read off ring gear mounting surface of differential case (2).
- 59. Pry between differential case (2) and bearing cap (5) on one side and zero indicator. Pry on opposite side to read end play.
- 60. Amount read on indicator is shim thickness that should be added to side bearing shims (3) to arrive at zero end play. Add necessary shims (3) and repeat procedure to ensure accuracy.
- 61. Tighten four capscrews (6) to 87 lb-ft (118 N•m).
- 62. Rotate differential case (2) and check runout. Runout should not exceed 0.002 in. (0.05 mm).
- 63. Remove dial indicator from housing (7).

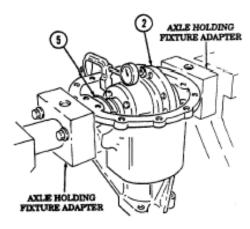
NOTE

Tag shims and bearing cups for assembly.

64. Remove four capscrews (6), two bearing caps (5), differential case (2), bearing cups (4), and shims (3) from housing (7).

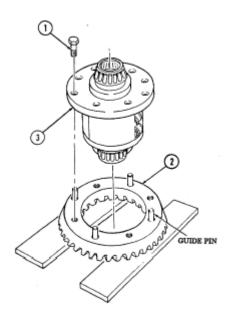






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- 65. Install four guide pins in ring gear (2).
- 66. Support ring gear (2) with wood blocks in press.
- 67. Press differential case (3) on ring gear (2).
- 68. Remove four guide pins from ring gear (2).
- 69. Install ring gear (2) on differential case (3) with eight capscrews (1). Tighten capscrews (1) to 95-115 lb-ft (129-156 N•m).



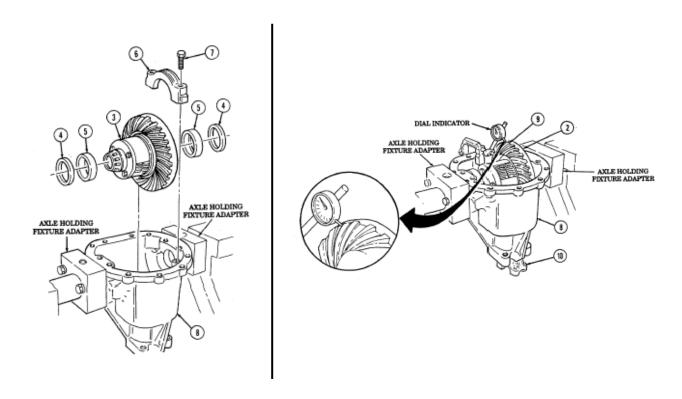
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- 70. Install two side bearing shims (4), previously selected to remove differential case side play, side bearing cups (5), and differential case (3) in housing (8).
- 71. Install two bearing caps (6) on housing (8) with four capscrews (7). Tighten capscrews (7) to 55-70 lb-ft (75-95 N•m).
- 72. Attach dial indicator to housing (8) and index indicator to read off drive side of ring gear tooth (9) at a right angle.

NOTE

Backlash must be checked at four equally spaced points on ring gear and must not vary more than 0.002 in. (0.50 mm) between four points checked.

- 73. Move ring gear (2) back and forth while holding pinion yoke (10) stationary. Note backlash registered on indicator.
- 74. Ring gear backlash should be 0.005-0.009 in. (0.12-0.22 mm) with 0.008 in. (0.20 mm) desired. If backlash must be adjusted, perform steps 75 through 78, if not go to step 79.



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NOTE

Tag shims and bearing cups for assembly.

75. Remove four capscrews (7), two bearing caps (6), bearing cups (5), shims (4), and differential case (3) from housing (8).

NOTE

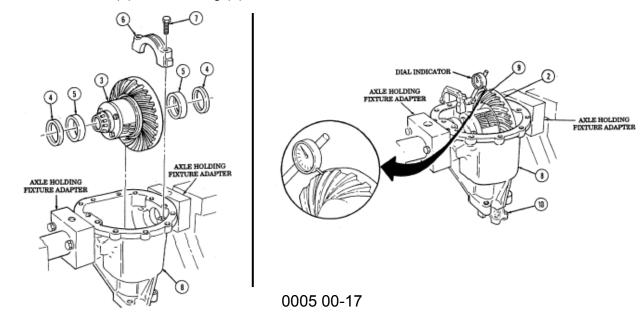
The following example will explain the procedure for adjusting backlash. If side play was removed using 0.090 in. (2.28 mm) shims on each side totaling 0.180 in. (4.57 mm) and backlash, when checked, is found to be 0.011 in (0.27 mm), add 0.004 in. (0.10 mm) to shim on ring gear side and subtract 0.004 in. (0.10 mm) from shim on opposite side to correct backlash. This will result in 0.094 in. (2.38 mm) shim on ring gear side and 0.086 in. (2.18 mm) shim on other side. Backlash will be approximately 0.007 to 0.008 in. (0.17 to 0.20 mm). "Total shim thickness" remains 0.180 in. (4.57 mm).

- 76. To increase backlash, install thinner shim (4) on ring gear side and thicker shim (4) on opposite side. To decrease backlash, install thicker shim (4) on ring gear side and thinner shim (4) on opposite side. Do not change "total shim thickness".
- 77. Install two shims (4), bearing cups (5), differential case (3), and two bearing caps (6) on housing (8) with four capscrews (7). Tighten capscrews (7) to 87 lb-ft (118 N•m).
- 78. Mount dial indicator and recheck backlash. If necessary, repeat steps 76 through 78.

NOTE

Tag shims and bearing cups for assembly.

79. Remove four capscrews (7), two bearing caps (6), bearing cups (5), shims (4), and differential case (3) from housing (8).



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80. Install differential housing spreader into holes in axle holding fixture adapters and install dial indicator to read from each end of housing (1). Indicator must have preload setting of 0.020 in. (0.50 mm).

CAUTION

Over-spreading of differential housing spreader will damage housing.

81. Spread housing (1) 0.010 in. (0.25 mm) and remove dial indicator.

NOTE

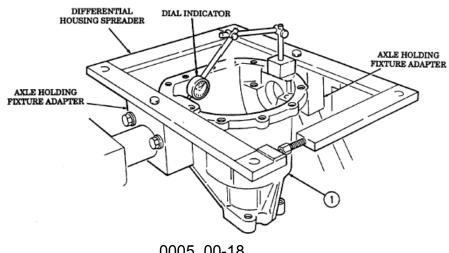
Differential bearings must be preloaded to compensate for heat and loads during operation.

- 82. Preload differential case side bearings (4) by increasing shims (2) thickness at each side of differential case (5) by 0.004 in. (0.10 mm) for a total bearing preload of 0.008 in. (0.20 mm).
- 83. Lubricate side bearings (4) with lubricating oil and install differential case (5), two bearing cups (3), shims (2), and bearing caps (6) in housing (1) with four capscrews (7).

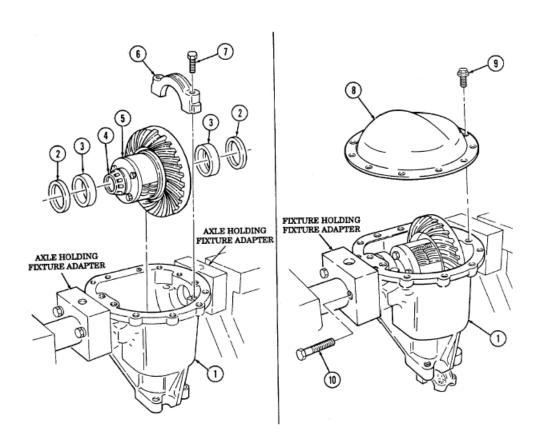
NOTE

Preloaded differential bearings may change backlash setting. Check and correct backlash if necessary.

- 84. Remove housing spreader and tighten four capscrews (7) to 87 lb-ft (118 N•m).
- 85. Apply silicone sealant to cover (8) sealing surface and install cover (8) on housing
- (1) with twelve capscrews (9). Tighten capscrews (9) to 16 lb-ft (22 N•m).
- 86. Remove housing (1) from holding fixture.
- 87. Remove four capscrews (10) and two axle holding fixture adapters from housing (1).

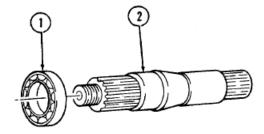


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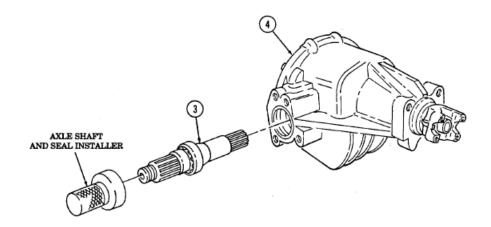


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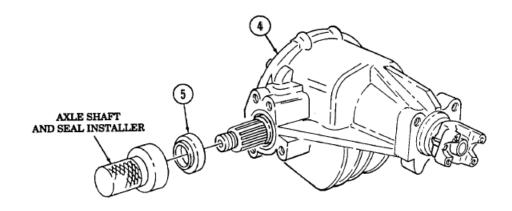
88. Using press, install two output shaft bearings (1) on output shafts (2).



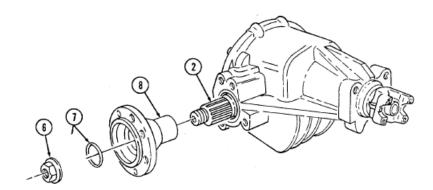
89. Using axle shaft and seal installer, install two output shaft assemblies (3) into housing (4).



90. Using axle shaft and seal installer, install two output shaft seals (5) in housing (4).



- 91. Lubricate sealing surface on two output flanges (8) with lubricating oil.
- 92. Install two output flanges (8), two O-ring seals (7), and two locknuts (6) on output shafts (2). Tighten locknuts (6) finger tight.



SUPPORTING INSTRUCTIONS

0006

THIS WORK PACKAGE (WP) COVERS:

Performance Test; Disposal; Final Painting, Refinishing, and Marking; and Quality Assurance

PERFORMANCE TEST

You will do a performance test on each differential repaired. A Quality Assurance (QA) Representative must witness this testing. Follow the instructions contained on **WP 0007** for testing the differential assembly. An After Repair Performance Test Report **WP 0008** must be completed for each differential repaired.

DISPOSAL

You are responsible for disposal of any unrepairable or unused parts or assemblies.

FINAL PAINTING, REFINISHING, AND MARKING

Upon completion of differential testing, touch-up any scratches on cover with primer. Apply finish coat of paint. Upon acceptable completion of differential overhaul a data plate shall be marked and installed.

Each differential should have a unique serial number.

QUALITY ASSURANCE

The repair activity will implement and maintain a Quality Assurance program that complies with ISO 9002 (dated 1994, tailored), "Quality System – Model for Quality Assurance in Production, Installation and Servicing."

NMWR 9-2520-585

AFTER REPAIR DIFFERENTIAL PERFORMANCE SPECIFICATIONS and TEST

0007

THIS WORK PACKAGE (WP) COVERS:

After Repair Differential Performance Specifications and Test

Rating

NSN 2520-01-291-2975: Gear Ratio: 2.56:1 NSN 2520-01-358-3160: Gear Ratio: 2.73:1

Free Running Test

- a Bench test differential.
- b Ensure differential gear are coated with suitable lubricant.

NOTE

Differential cannot be shipped filled with differential lubricant.

- c Perform a free-running, no load test by rotating the input shaft by hand in both directions (minimum of 360° in each direction) and alternately holding output flanges, noting operation. All shafts must turn freely and smoothly.
- d Pressurize differential to 2.5 psi. minimum to 5 psi. maximum. Ensure there are no leaks.
- e Check for malfunctions, unusual noises, or evidence of binding. None allowed.

NMWR 9-2520-585

After Repair Performance Test Repo	ort 0008				
THIS WORK PACKAGE (WP) COVERS: After Repair Differential Performance Test Repor	t				
STAMIS WORK ORDER NUMBER					
Repair Site Control Number					
Repaired Differential Serial Number					
Repair Date					
Repair Facility Address					
Test Performed BY	Date				
Witnessed By	Date Quality Representative				
You will do a Bench Test (WP 0007) on each differential repaired. As part of the Bench Test a Test Report should be kept at the Repair Facility for a minimum of two (2) years. You will also attach a Repair Facility Data Plate of your design to the differential including the NSN or NIIN.					
Malfunctions, unusual noises, and evidence of bi	nding Yes NO				

SPECIAL PACKAGING INSTRUCTIONS

0009

THIS WORK PACKAGE (WP) COVERS:

Special Packaging Instructions

Additional Packaging information can be found in this Web site. You must enter the Part Number at the Query screen. You will need to have the ImageR viewer to view the images. You can down load the viewer from the Web Site by going to the link below and following the directions. You may have to "cut and paste" the link below to your address bar in your browser.

https://www-tdps.tacom.army.mil/PACKInstructions.asp









WP 0010 needs to be overpacked with each repaired differential.

ADDITIONAL REPAIR INSTRUCTIONS

0010

THIS WORK PACKAGE (WP) COVERS:

Additional Repair Instructions

CAUTION

Failure to follow proper installation instructions for differential in accordance with TM 9-2320-280-34, dated 31 January 1996, Chapter 9, paragraph 9-5, pages 9-8 and 9-9 will relieve the repairing activity of responsibility.

If you are required to change out the pinion yoke (3) or pinion flange (5) to meet your vehicle configuration, you must first measure the torque required to rotate pinion yoke (3) on service differential (1) and record (see instruction 1 of TM) prior to removal of locknut (4). Then follow the appropriate installation instructions based on differential serial number USBL, and front or rear differential installation. Failure to follow these specific installation requirements will cause a loss of the preload on the pinion shaft bearings resulting in a premature breakdown of the differential and void the warranty.

NOTE

The installing activity is responsible to fill differential to proper oil level (TM 9-2320-280-20).

A copy of TM 9-2320-280-34, Chapter 9, Paragraph 9-5 (Installation Instructions) has been provided for your convenience.

0010

TM 9-2320-280-34

NOTE

- New configuration (P/N 12338415-3) differentials are provided with a pinion yoke and slinger installed. Four O-rings and three locknuts are also provided, but not installed. Output flanges are not provided.
- No modification to service differential is required when replacing rear differential on vehicles with serial numbers USBL Eff. 44825 and above.
- If service differential is replacing a front differential, the service yoke must be replaced and the slinger removed.
- If service differential is replacing a rear differential on vehicles with serial numbers USBL Eff. 44825 and below, the service yoke must be replaced with a flange.
- Perform step 1 for front and rear differential installation.

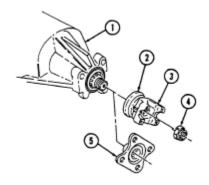
Installation

1. Measure torque required to rotate pinion yoke (3) on service differential (1) and record.

NOTE

Perform steps 2 through 5 for front differential only.

- 2. If necessary, remove locknut (4) and pinion yoke (3) from old differential (1). Discard locknut (4).
- 3. Remove locknut (4) and pinion yoke (3) from service differential (1). Remove slinger (2). Discard locknut (4).
- 4. Install new pinion voke (3) and locknut (4) on service differential (1).
- 5. Tighten locknut (4) in small increments, until torque required to rotate pinion yoke (3) exceeds original measurement (step 1) by 2 lb-in. (0.2 N•m).



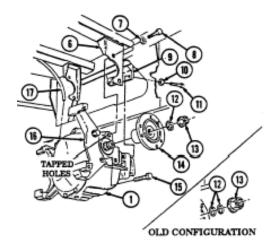
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- 6. For rear differentials, apply sealing compound to differential (1) tapped holes. Install two brake caliper adapters (16) on differential (1) with four capscrews (15). Tighten capscrews (15) to 110-140 lb-ft (149-190 N•m).
- 7. If removed, installation of new configuration side mounting brackets (6) is recommended, refer to (para. 12-16).
- 8. Raise differential (1) into place and connect vent line (17).

CAUTION

Apply a liberal amount of thread sealing compound to the tapped holes of differential. To allow adequate coating of threads, install capscrews shortly after applying thread sealing compound. Failure to do this could allow capscrews to loosen and cause damage to differential.

9 .Apply sealing compound to differential (1) tapped holes. Install capscrews (8), washers (7), and differential (1) on side mounting brackets (6).



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NOTE

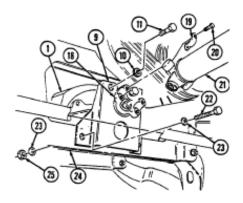
Perform step 10 if replacing front differential.

10. Install mounting bracket (9) on frame crossmember (24) with two washers (23), capscrews (22), washers (23), and locknuts (25). Tighten locknuts (25) to 90 lb-ft (122 N•m).

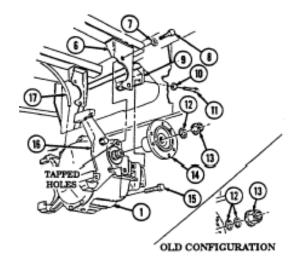
NOTE

Washers are not required when securing front differential to mounting bracket.

11. Apply sealing compound to capscrews (11). Install two capscrews (11), washers (10), and differential (1) on mounting bracket (9).



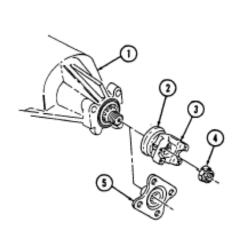
12. Tighten capscrews (8) and (11) to 110-140 lb-ft (149-190 N•m).

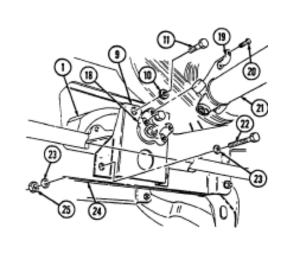


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NOTE

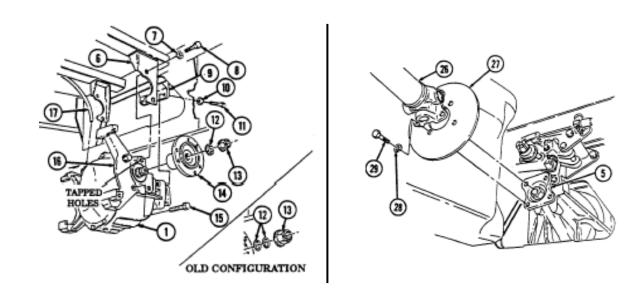
- Perform steps 13 and 18 if replacing front or rear differential on vehicles with serial numbers USBL Eff. 44825 and above.
- Perform steps 14 through 18 if replacing rear differential on vehicles with serial numbers USBL Eff. 44825 and below.
- 13. Connect propeller shaft (21) to pinion yoke (18) with two straps (19) and four capscrews (20). Tighten capscrews (20) to 13-18 lb-ft (18-24 N•m).
- 14. Remove locknut (4) and pinion yoke (3) from service differential (1).
- 15. Install pinion flange (5) and locknut (4) on service differential (1).
- 16. Tighten locknut (4) in small increments, until torque required to rotate pinion flange (5) exceeds original measurement (step 1) by 2 lb-in. (0.2 N•m).





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- 17. Install parking brake rotor (27) and connect propeller shaft (26) to pinion flange (5) with four capscrws (29), and lockwashers (28). Tighten capscrews (29) to 60 lb-ft (81 N•m).
- 18. Install two output flanges (14), seal washers (12), and two locknuts (13). Tighten locknuts (13) to 165-195 lb-ft (224-264 N•m).



MANDATORY REPAIR LIST

0011

THIS WORK PACKAGE (WP) COVERS:

Mandatory Repair List

Mandatory Repair List

Mandatory replacement parts listed are those parts considered unserviceable after removal during disassembly procedures. All gaskets, seals, cotter pins, and standard stock of this type will be replaced as well as those components which are considered incapable of proper performance until the next recapitalization effort. To eliminate the necessity of more costly inspections all other items of negligible cost are also to be replaced.

ITEM DESCRIPTION	PART NUMBER	NSN	QTY
Nut, self-locking hex flange	5579442	5330-01-175-0617	3
Rear differential, 7/8-14			
O-Ring Packing	5939517	5330-01-487-7129	2
Seal, pinion, encased	5579448	5330-01-174-8146	1
Differential, axle pinion			
Seal, pinion, encased	6009472	5330-01-174-8145	2
Differential output shaft			
Spacer, sleeve differential	5579450	5365-01-180-2585	1
Axle pinion			
As required for Conversion			
and/or Replacement			
***Differential Gear	5936107	2520-01-357-5056	1
Bearings		3110-00-892-0896	2
	LM603049LM603		
	012		

DIFFERENTIAL GUIDE PIN FABRICATION

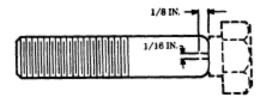
0012

THIS WORK PACKAGE (WP) COVERS:

Differential Guide Pin Fabrication

INSTRUCTIONS

- 1. Fabricate from screw, NSN 5305-00-709-8540.
- 2. Cut off head of screw.
- 3. Round off edge of non-threaded end as shown below.
- 4. Cut a slit approximately 1/16 in. wide and 1/8 in. deep in non-threaded end as shown below.
- 5. Remove any burs after cutting.



Differential Guide Pin